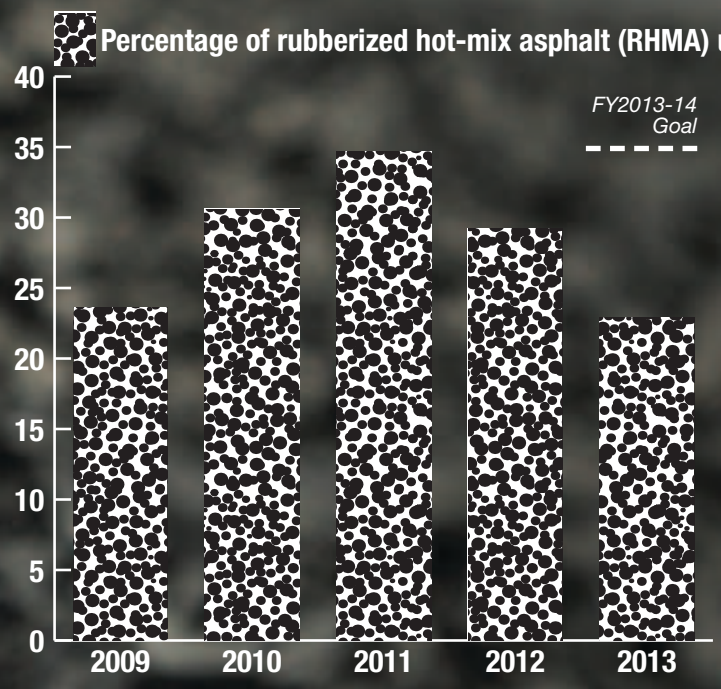
Crumb rubber from recycled tires is added to asphalt pavement. This not only reduces the number of tires that end up in landfills, it also adds elasticity to the pavement, making it more resistant to cracking and stress from temperature changes.

Crumb Rubber Usage Goal In Need of a Bounce

California law requires Caltrans to use 11.58 pounds of crumb rubber modifier per metric ton of its total asphalt paving material. This means that Caltrans must use crumb rubber in about 35 percent of the total hot-mix asphalt it places statewide. In 2012, however, only about 29 percent of Caltrans' statewide asphalt paving used rubberized hot-mix asphalt (RHMA – hot-mix asphalt containing crumb rubber), and in 2013, the amount dropped further to about 23 percent. This was due to a higher percentage of projects that require conventional asphalt for the base layers. Asphalt containing crumb rubber can only be used on the top two inches of the pavement surface. If the base layers were excluded from the overall calculation, the percentage of asphalt containing crumb rubber would be 37 percent, rather than the 23 percent calculated using the total amount of all asphalt paving materials.



This graph shows that in 2011, Caltrans used more than 2.6 million tons of RHMA in its statewide asphalt paving. Caltrans' mandated goal in 2013 was that at least 35 percent of the highway system's asphalt pavement be RHMA. By 2013, however, the amount had decreased to about 1 million tons, dropping the percentage of asphalt pavement that used crumb rubber to only 23 percent.

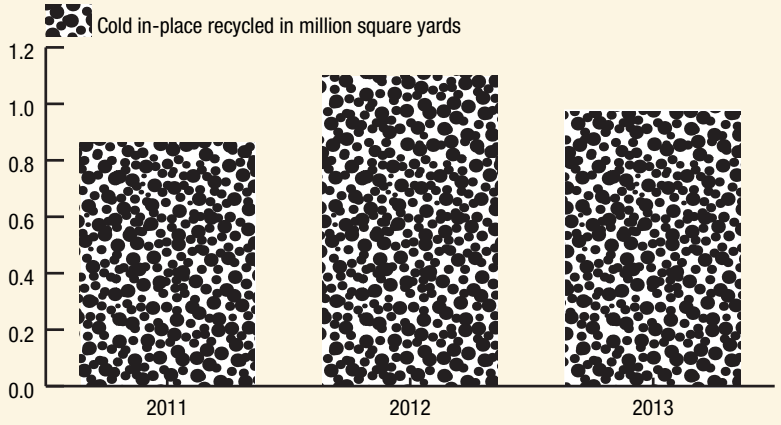
RHMA uses recycled tires, and every mile of RHMA pavement prevents 150 old tires from going to landfills. RHMA also adds elasticity to the highway, making it less susceptible to cracking and stress from temperature changes.

While the initial cost of RHMA is higher than the cost of conventional asphalt – up to 38 percent more – RHMA is cost effective when used to resist cracking. About half as much RHMA is needed to prevent cracking in overlays than would be needed if conventional asphalt were used.

To make sure Caltrans meets its legally mandated use of crumb rubber, the department is requiring that all asphalt paving projects use RHMA. If RHMA is not used, the Caltrans district director for the project area must approve an exemption stating that RHMA is not an appropriate option. Caltrans is also updating the "Flexible Pavement" section of its Highway Design Manual to identify RHMA as the default surface pavement. In some situations, however, RHMA is not appropriate for a project. For instance, RHMA may not be economical for jobs requiring 1,000 tons or less of asphalt, and it is not a good alternative if it will be placed in temperatures

below 45 degrees or in elevations above 3,000 feet. Furthermore, because of its flexibility, RHMA can only be used in the top 2 to 2.5 inches of the pavement surface and cannot be used below that.

Another "green" pavement Caltrans uses is cold-in-place recycling that removes old paving material, reprocess it on-site, and places it as a new roadway. Cold-in-place recycling projects are targeted for use on rural two-lane highways that are vital to tourism throughout California. In 2013, Caltrans' funding for cold-in-place recycling was about $23 million. In fiscal year 2014–15, however, there was a one-time $45 million boost to repair and replace rural two-lane highways with cold-in-place recycled asphalt to increase safety and protect the environment. The amount is expected to become stable at $18 million annually in the future.



Since 2012, Caltrans' use of cold-in-place pavement recycling has remained at about 1 million square yards each year. In fiscal year 2014–15, there was a one-time $45 million boost to repair and replace rural two-lane highways with cold-in-place recycled asphalt to increase safety and protect the environment. The amount is expected to stabilize at $18 million annually.

Caltrans also is proposing to recycle old asphalt roofing shingles and use the material as a component of new asphalt. Adding recycled asphalt shingles or reclaimed asphalt pavement reduces the amount of raw materials that have to be mined or refined. Caltrans is developing specifications that would allow the use of up to 5 percent recycled asphalt shingles and up to 40 percent reclaimed asphalt pavement in its hot-mix asphalt.

And, because freeway traffic can create noise in urban areas, Caltrans is testing different techniques to help reduce noise on both concrete and asphalt pavements. For concrete, the "next generation grind and groove technology" smoothly grinds concrete pavements and reduces tire-pavement noise. Open-graded asphalt concrete leaves small voids on the pavement surface to reduce tire-pavement noise, and these sustainable pavements can be used when soundwalls are not practical.

Source: Division of Maintenance
Contributors: Susan Massey, Bob Moore and Douglas Mason

Newly laid rubberized hot-mix asphalt is placed on State Route 33 in the cities of Patterson and Newman in Stanislaus County.